

Upper 9-Mile Proposed Baseline Monitoring

EPA/CPG Teleconference

October 17, 2018

Upper 9-Mile Remedy – Proposed Baseline Monitoring

- CSTAG identified baseline monitoring as a key component of the Interim Action (see comment below)
- EPA-CPG call on 9/19/18 to discuss preliminary baseline monitoring concepts
- At EPA request, these slides present a proposed baseline monitoring program

7. Baseline and Long-Term Monitoring

a) As noted in Principle 11 of the 2002 Directive, it is essential that adequate baseline data be collected before any remedial activities. Without adequate baseline data, the effectiveness of the Interim Remedy and progress toward remedial goals cannot be tracked. CSTAG recommends that the baseline monitoring include annual sampling of biota and surface water for at least three years prior to beginning the remedial action, and at least one sediment sampling event during that same period. If the biota and surface water sampling occurs over the same period as the sediment sampling for the Pre-design Investigation (PDI), the PDI surface sediment data may also be used as baseline sediment data. While CSTAG recognizes that a detailed baseline and long-term monitoring plan may not be developed before the interim ROD is signed, key elements of the baseline and long-term monitoring plans should be described in the interim ROD.

Upper 9-Mile Remedy – Monitoring Elements

- **Baseline – to establish baseline conditions, temporal trends**
- Pre-design investigation – to determine remedial footprint, support remedial design (geotechnical data, disposal), fill data gaps
- Performance/construction monitoring – during remedy implementation
- Long-term monitoring – to measure remedy performance and support adaptive management

Proposed Baseline Monitoring - Overall Objectives

- Establish pre-remedy conditions for comparison with post-remedy conditions
 - To assess remedy performance
 - Tissue and water column
- Identify and characterize temporal trends
 - For comparison with RI data
 - To assess ongoing recovery
- Characterize variability
 - To provide a basis to interpret water column data
- Fill data gaps/refine ST, CFT, and FWM models
- Support Adaptive Management

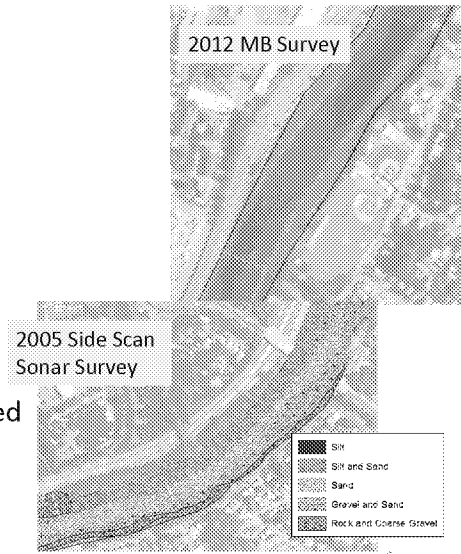
Proposed Elements of Baseline Monitoring

- Bathymetry –
 - AQ is currently drafting a QAPP Addendum
- Water Column -
 - Within the upper 9 miles
 - Over Dundee Dam
- Biota
 - Fish and Crab Tissue
 - Benthic
- Sediment
 - Proposed as part of PDI
 - Not a primary metric for remedy performance

Baseline Monitoring - Bathymetry

- Objectives

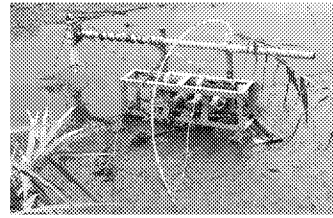
- Updated bathymetry
 - Comparison with 2012
 - Baseline bank-to-bank for comparison with future surveys to identify potentially erosional areas
- Updated and detailed grain size distribution map
 - Collection of side-scan sonar and confirmatory surficial sediments
 - Comparison with 2005
- Provide a basis for developing a spatially refined hydrodynamic model



Proposed Baseline Monitoring – Water Column

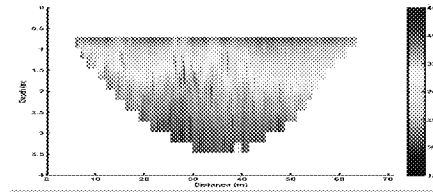
- Objectives:

- Characterize solids and COC fluxes into and out of the upper 9 mile reach for evaluation of remedy effectiveness
- Characterize water column COC concentrations within the reach, for comparison with post-remedy conditions



- General approach

- Deployed moorings and surface water samples at multiple locations
- OPTICS evaluation to support analytical data



Proposed Water Column Sampling – Upper 9 Miles

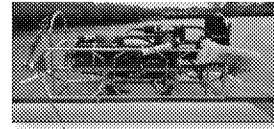
- Characterization of solids and COC fluxes:
 - Between upper and lower LPR
 - Within the upper 9 miles
- Refinement of baseline water column concentrations to support future performance monitoring
- Assess temporal COPC trends since 2011/2013
- Characterize temporal variability
- Evaluate potential for upriver recontamination
- Develop dataset for calibrating the refined ST/CFT models

Proposed Water Column Sampling - Dundee Dam

- Characterization of solids loadings and particulate COPC concentrations to:
 - Refine understanding of upriver background and recontamination potential
 - Provide refined understanding of solids loading and composition to support refined sediment transport model
 - Provide better boundary conditions for use in refined model (ST and CFT)
 - Assess whether boundary COPC concentrations have changed from those measured in the 2011/2013 – basis for assumptions about future changes in recontamination potential
 - Characterize temporal variability

Proposed Water Column Sampling Approach

- Monitoring at RM 8.3, RM 10.2, RM 12, RM 17 (Dundee Dam)
- Moorings to capture:
 - Time series of velocities
 - Time series of water column solids
- Grab sampling to capture:
 - Tidal variation
 - Spring-neap variation
 - High freshwater inflows
- Data evaluation of direct, acoustic, and optical measurements to characterize solids and contaminant fluxes and variability



Proposed Fish/Crab Sampling Assumptions

- Data Use Objectives:

- FWM refinement
- Establish baseline for trend analysis
- Update risk assessments for risk communication purposes

- Proposed species for baseline data collection:

Species	Proposed Tissue Type	Year 1	Years 2 + 3
American eel – large	Fillet, remainder (calc'd WB)	X	X
Bass	Fillet, remainder (calc'd WB)	X	
Blue crab	muscle/hep, carcass (calc'd WB)	X	
Catfish	Fillet, remainder (calc'd WB)	X	
Carp – larger	Fillet, remainder (calc'd WB)	X	X
Small fish – benthic	Whole body	X	X
White perch – larger	Fillet, remainder (calc'd WB)	X	X

Proposed Fish/Crab Sampling Approach

- **Analytes:** only risk drivers
 - BERA: Dioxins/furans, PCBs, and DDX
 - HHRA: Dioxins/furans and PCBs
- **Segmentation of river:**
 - Focus on FWM segments:
 - RM 8.3-14.7 (sampling sub-areas: RM 8.3-10, RM 10-12, and RM 12-14.7)
 - RM 14.7-Dam (no sub-areas needed)
 - Objective is to understand area-wide average for upper 9 miles.
- **Timing:** Collect samples at a consistent time (late summer/early fall as done in 2009)
- **Sample Type:**
 - Year 1 – composite samples
 - Improves estimate of area-wide average
 - Reduces total number of samples (and analytical cost)
 - Year 2 and 3 – individual samples (fillet and remainder) for American eel, carp, perch; composite for small benthic fish
 - Improve accuracy of trend analysis
- **Target size:** Sampling plan would determine specific size to be sampled.

Proposed Benthic Invertebrate Data Assumptions

- Data use objective
 - Refinement of FWM - collect data to refine exposure for benthic invertebrate feeding guilds
- Proposed Approach
 - Horizontal benthic community biomass and trophic guild structure (6 locations and 4 depth horizons; 24 samples)
 - Corresponding sediment chemistry data (for CFT model verification)

Pre-remedy Sediment Sampling

- Pre-remedy sediment monitoring survey proposed to be performed with PDI
- Proposed PDI Sediment Sampling Program
 - Sediment cores locations:
 - RM 8.3 to RM 15 – Grid on 80' centers
 - RM 15 to DD – Transects every 1000', 3 samples each (~13 transects)
 - 4 samples/core:
 - 0 to 0.5', 0.5' to 1.5', 1.5' to 2.5', 2.5' to 3.5'
 - Shorter cores where native material/hard bottom is encountered

Proposed Baseline Monitoring Program

Component	Year	Locations	Analytes
Bathymetry	2018	RM 8.3-15, including shallow areas	--
Water Column	<ul style="list-style-type: none"> • 2019: 12 mos. deployment, monthly sampling • 2020&2021: 1-two mos. deployment, monthly sampling 	RM 8.3 RM 10.2 RM 12 RM 17 (Dundee Dam)	D/Fs, PCBs, DDx, MeHg, DOC, POC, TSS
Biota	<ul style="list-style-type: none"> • 2019: 4 weeks • 2020&2021: 2-3 weeks 	RM 8.3-Dundee Dam	D/Fs, PCBs, DDx
Benthic	2020	RM 8.3-15	D/Fs, PCBs